# OC45

# Biomimetic electrochemical sensor integrated in flexible polymeric devices for cancer diagnosis

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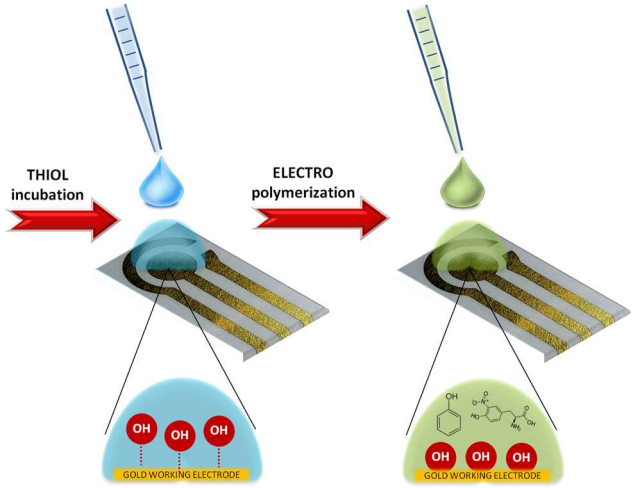
Early diagnosis of cancer biomarkers has currently been pointed out as a crucial tool to improve the therapeutic strategies and, subsequently, to increase the survival rates. Particularly, various studies have suggested a strong link between oxidative stress (OS) biomarkers and diverse aging-associated degenerative diseases including cancer[1,2]. In this context, the development of simple, affordable and easy-to-use diagnostic assays are of great valuable to be use in *point-of-care* (POC) testing.
Herein, we have developed highly sensitive electrochemical sensors by applying a single (gold) conducting layer on the top of flexible, transparent polymeric substrates. Different parameters, such as, adherence, roughness and gold thickness were carefully investigated and the electrochemical performance of these electrodes was assessed by cyclic voltammetry (CV). As a proof-of-concept, the electrodes were coated with a molecular imprinted polymer (MIP) designed for sensitive electrochemical detection of 3-nitrotyrosine (3-NT), a known OS biomarker[3]. This biomimetic material was produced by electropolymerization of the phenol monomer (*see* ***scheme 1***) and several experimental parameters, such as, number of cycles, range of potential applied, monomer and template concentrations were optimized in order to finely tailor the characteristics of the imprinted molecular cavities. Finally, the analytical performance of the (bio)sensor device was assessed by performing calibration curves in phosphate buffer solution near physiological pH. Under optimal conditions, the developed sensor showed good sensitivity and limits of detection down to picoMolar level.
Overall, the described low-cost flexible electrodes hold the potential to become a quick, disposable sensing device for *in-situ* detection of 3-NT. Besides the mentioned attributes, when compared to previous methods, the proposed technology showed one of the best limits of detection found in literature.




**Scheme 1:** Schematic representation of the assembly of the gold-modified biomimetic sensor.

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